

# HA-F Hot Air Dryer

Effective: 5/15/15 Part Number: 882.03122.00 Bulletin Number: DRY2-605.00

Write Down Your Serial Numbers	Here For Future Re	eference:	
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Hot Air Dryers ii

## **Shipping Info**

#### Unpacking and Inspection

You should inspect your dryer for possible shipping damage.

Thoroughly check the equipment for any damage that might have occurred in transit, such as broken or loose wiring and components, loose hardware and mounting screws, etc.

#### In the Event of Shipping Damage

According to the contract terms and conditions of the Carrier, the responsibility of the Shipper ends at the time and place of shipment.

Notify the transportation company's local agent if you discover damage.

Hold the damaged goods and packing material for the examining agent's inspection. **Do not** return any goods before the transportation company's inspection and authorization.

File a claim with the transportation company. Substantiate the claim by referring to the agent's report. A certified copy of our invoice is available upon request. The original Bill of Lading is attached to our original invoice. If the shipment was prepaid, write us for a receipted transportation bill.

Advise customer service regarding your wish for assistance and to obtain an RMA (return material authorization) number.

#### If the Shipment is Not Complete

Check the packing list as back-ordered items are noted on the packing list. You should have:

- ☑ Hot Air Dryer
- ☑ Bill of lading
- ☑ Packing list
- ☑ Operating and Installation packet
- ☑ Electrical schematic and panel layout drawings
- ☑ Component instruction manuals

Re-inspect the container and packing material to see if you missed any smaller items during unpacking.

#### If the Shipment is Not Correct

If the shipment is not what you ordered, **contact the shipping department immediately**. For immediate assistance, please contact the correct facility located in the technical assistance section of this manual. Have the order number and item number available. *Hold the items until you receive shipping instructions*.

#### Returns

Do not return any damaged or incorrect items until you receive shipping instructions from the shipping department.

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#### **Credit Returns**

<u>Prior</u> to the return of any material **authorization** must be given by **the manufacturer.** A RMA number will be assigned for the equipment to be returned.

Reason for requesting the return must be given.

<u>ALL</u> returned material purchased from **the manufacturer** returned is subject to 15% (\$75.00 minimum) restocking charge.

ALL returns are to be shipped prepaid.

The invoice number and date or purchase order number and date must be supplied.

No credit will be issued for material that is not within the manufacturer's warranty period and/or in new and unused condition, suitable for resale.

#### **Warranty Returns**

<u>Prior</u> to the return of any material, authorization must be given by **the manufacturer.** A RMA number will be assigned for the equipment to be returned.

Reason for requesting the return must be given.

All returns are to be shipped prepaid.

The invoice number and date or purchase order number and date must be supplied.

After inspecting the material, a replacement or credit will be given, at **the manufacturer's** discretion. <u>If</u> the item is found to be defective in materials or workmanship, and it was manufactured by our company, purchased components are covered under their specific warranty terms.

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## **Chapter 1: Safety**

#### 1-1 How to Use This Manual

Use this manual as a guide and reference for installing, operating, and maintaining your dryer. The purpose is to assist you in applying efficient, proven techniques that enhance equipment productivity.

This manual covers only light corrective maintenance. No other maintenance should be undertaken without first contacting a service engineer.

The Functional Description section outlines models covered, standard features, and safety features. Additional sections within the manual provide instructions for installation, preoperational procedures, operation, preventive maintenance, and corrective maintenance.

The Installation chapter includes required data for receiving, unpacking, inspecting, and setup of the dryer. We can also provide the assistance of a factory-trained technician to help train your operator(s) for a nominal charge. This section includes instructions, checks, and adjustments that should be followed before commencing with operation of the dryer. These instructions are intended to supplement standard shop procedures performed at shift, daily, and weekly intervals.

The Operation chapter includes a description of electrical and mechanical controls, in addition to information for operating the dryer safely and efficiently.

The Maintenance chapter is intended to serve as a source of detailed assembly and disassembly instructions for those areas of the equipment requiring service. Preventive maintenance sections are included to ensure that your dryer provides excellent, long service.

The Troubleshooting chapter serves as a guide for identification of most common problems. Potential problems are listed, along with possible causes and related solutions.

The Appendix contains technical specifications, drawings, schematics, parts lists, and available options. A spare parts list with part numbers specific to your machine is provided with your shipping paperwork package. Refer to this section for a listing of spare parts for purchase. Have your serial number and model number ready when ordering.

#### Safety Symbols Used in this Manual

The following safety alert symbols are used to alert you to potential personal injury hazards. Obey all safety messages that follow these symbols to avoid possible injury or death.



DANGER indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury.



WARNING indicates a potentially hazardous situation or practice that, if not avoided, could result in death or serious injury.

CAUTION indicates a potentially hazardous situation or practice that, if not avoided, may result in minor or moderate injury or in property damage.

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## **Dryer Safety Tags**

Hazard Alert	Description/Explanation	Preventative Maintenance	
Symbol			
	High Voltage Hazard. The electrical	Every six months inspect all electrical	
	enclosure is supplied with 3-phase electrical	connections for secure attachment. For	
/ / /	power. Use caution when using or	further information see the	
	maintaining this product.	Maintenance Chapter in this manual	
	Hot Surface Hazard. When the unit operates	Every six months inspect all surfaces	
	above 212F (100C) the surface of the unit	for signs of heat degradation. If any	
	may reach excessive temperatures. Use	appear remove panel and verify cause	
	caution when using or maintaining this	of degradation and repair.	
	product.		

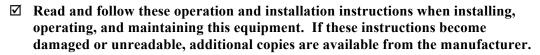
Mandatory Symbol	Description/Explanation
	Read Operators Manual. This equipment must be operated and maintained by properly trained personnel. The information contained within this manual must be read and understood prior to operating this equipment.
	Lock Out. This equipment is operated with 3-phase electrical power. Therefore, when performing any maintenance operations we recommend following the local standards for performing a lock-out/tag-out procedure.

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## 1-2 Warnings and Precautions

Our dryers are designed to provide safe and reliable operation when installed and operated within design specifications, following national and local safety codes.

To avoid possible personal injury or equipment damage when installing, operating, or maintaining this dryer, use good judgment and follow these safe practices:





- ☑ Wear SAFETY GLASSES and WORK GLOVES.
- ☑ Disconnect and/or lock out power before servicing or maintaining the hot air dryers
- ☑ Use care when **LOADING**, **UNLOADING**, **RIGGING**, or **MOVING** this equipment.
- ☑ Operate this equipment with design specifications.
- ☑ **OPEN, TAG,** and **LOCK ALL DISCONNECTS** before working on equipment. You should remove the fuses and carry them with you.
- ✓ Make sure the hot air dryers and components are properly **GROUNDED** before you switch on power.
- ☑ Do not jump or bypass any electrical safety control.
- ☑ Do not restore power until you remove all tools, test equipment, etc. and the hot air dryers and related equipment are fully reassembled.
- ☑ Only **PROPERLY TRAINED** personnel familiar with the information in this manual should work on this equipment.

We have long recognized the importance of safety and have designed and manufactured our equipment with operator safety as a prime consideration. We expect you, as a user, to abide by the foregoing recommendations in order to make operator safety a reality.







## 1-3 Responsibility

These machines are constructed for maximum operator safety when used under standard operating conditions and when recommended instructions are followed in the maintenance and operation of the machine.

All personnel engaged in the use of the machine should become familiar with its operation as described in this manual.

Proper operation of the machine promotes safety for the operator and all workers in its vicinity.

Becoming familiar with materials, inspection, speed limitations, screens, and guard maintenance and total user responsibility will assist you in learning potential areas in need of observation for danger.

Each individual must take responsibility for observing the prescribed safety rules as outlined. All caution, warning and danger signs must be observed and obeyed. All actual or potential danger areas must be reported to your immediate supervisor.

#### General Responsibility

No matter who you are, safety is important. Owners, operators and maintenance personnel must realize that every day, safety is a vital part of their jobs.

If your main concern is loss of productivity, remember that production is always affected in a negative way following an accident. The following are some of the ways that accidents can affect your production:

- Loss of a skilled operator (temporarily or permanently)
- Breakdown of shop morale
- Costly damage to equipment
- Downtime

An effective safety program is responsible and economically sound.

Organize a safety committee or group, and hold regular meetings. Promote this group from the management level. Through this group, the safety program can be continually reviewed, maintained, and improved. Keep minutes or a record of the meetings.

Hold daily equipment inspections in addition to regular maintenance checks. You will keep your equipment safe for production and exhibit your commitment to safety.

Please read and use this manual as a guide to equipment safety. This manual contains safety warnings throughout, specific to each function and point of operation.

#### **Operator Responsibility**

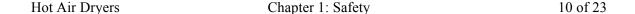
The operator's responsibility does not end with efficient production. The operator usually has the most daily contact with the equipment and intimately knows its capabilities and limitations.

Plant and personnel safety is sometimes forgotten in the desire to meet incentive rates, or through a casual attitude toward machinery formed over a period of months or years. Your employer probably has established a set of safety rules in your workplace. Those rules, this manual, or any other safety information will not keep you from being injured while operating your equipment.

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Learn and always use safe operation. Cooperate with co-workers to promote safe practices. Immediately report any potentially dangerous situation to your supervisor.

- ☑ NEVER place your hands or any part of your body in any dangerous location.
- ☑ NEVER operate, service, or adjust the dryer without appropriate training and first reading and understanding this manual.
- ☑ NEVER try to pull material out of the dryer with your hands while it is running!
- ☑ Before you start the dryer, check the following:
  - Remove all tools from the dryer;
  - Be sure no objects (tools, nuts, bolts, clamps, bars) are laying in the area;
- ☑ If your dryer has been inoperative or unattended, check all settings before starting.
- ☑ At the beginning of your shift and after breaks, verify that the controls and other auxiliary equipment are functioning properly.
- ☑ Keep all safety guards in place and in good repair. **NEVER** attempt to bypass, modify, or remove safety guards. Such alteration is not only unsafe, but will void the warranty on your equipment.
- ☑ When changing control settings to perform a different mode of operation, be sure selector switches are correctly positioned. Locking selector switches should only be adjusted by authorized personnel and the keys removed after setting.
- ☑ Report the following occurrences **IMMEDIATELY:** 
  - unsafe operation or condition
  - · unusual dryer action
  - leakage
  - improper maintenance
  - **NEVER** stand or sit where you could slip or stumble into the dryer while working on it.
- **☑ DO NOT** wear loose clothing or jewelry, which can be caught while working on the dryer. In addition, cover or tie back long hair.
- ☑ Clean the dryer and surrounding area **DAILY**, and inspect the machine for loose, missing or broken parts.
- ☑ Shut off power to the dryer when it is not in use. Turn the switch to the **OFF** position, or unplug it from the power source.





#### Maintenance Responsibility

Proper maintenance is essential to safety. If you are a maintenance worker, you must make safety a priority to effectively repair and maintain equipment.

Before removing, adjusting, or replacing parts on a machine, remember to turn off all electric supplies and all accessory equipment at the machine, and disconnect and lockout electrical and pneumatic power. Attach warning tags to the disconnect switch and air shutoff valve.



When you need to perform maintenance or repair work on a dryer above floor level, use a solid platform or a hydraulic elevator. If there is a permanently installed catwalk on your dryer, use it. The work platform should have secure footing and a place for tools and parts. **DO NOT** climb on the dryer, machines, or work from ladders.

If you need to repair a large component, use appropriate handling equipment. Before you use handling equipment (portable "A" frames, electric boom trucks, fork trucks, overhead cranes) be sure the load does not exceed the capacity of the handling equipment or cause it to become unstable.

Carefully test the condition of lifting cables, chains, ropes, slings, and hooks before using them to lift a load.

Be sure that all non-current carrying parts are correctly connected to earth ground with an electrical conductor that complies with current codes. Install in accordance with national and local codes.

When you have completed the repair or maintenance procedure, check your work and remove your tools, rigging, and handling equipment.

Do not restore power to the dryer until all persons are clear of the area. **DO NOT** start and run the dryer until you are sure all parts are functioning correctly.

BEFORE you turn the dryer over to the operator for production, verify all enclosure panels, guards and safety devices are in place and functioning properly.

#### Reporting a Safety Defect

If you believe that your equipment has a defect that could cause injury, you should immediately discontinue its use and inform the manufacturer.

The principle factors that can result in injury are failure to follow proper operating procedures (i.e. lockout/tagout), or failure to maintain a clean and safe working environment.

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## **Chapter 2: Functional Description**

#### 2-1 Models Covered in This Manual

This manual provides all necessary information for installing, operating, and maintaining the HA-F 750. The HA/SHA/CHA Series Hot Air Dryers come in model numbers from 85 to 4000 models. The dryer number designation represents air flow capacity.

Model Number SCFM SCMH 

Figure 1: Hot Air Dryer Air Flow Capacity

## 2-2 Equipment Function

Hot air dryers are designed to deliver heated air to a drying hopper to drive moisture of the surface of plastic pellets. Hot air dryers are sized to meet the specific requirements stated by the purchaser at the time of purchase. Hot air dryers are used to deliver between 85 and 4000 scfm (see above figure) at temperatures up to 250° F (121° C).

## 2-3 Necessary Documents

The documents listed below are necessary for the operation, installation, and maintenance of hot air dryers. Additional copies are available from the manufacturer. Make sure that the appropriate personnel are familiar with these documents:

- This manual.
- The schematic and connection diagram in the control enclosure.
- The operation and installation manuals for accessories and options selected by the customer.

#### 2-4 Standard Features

- ☑ Regenerative (85-225 scfm units) or centrifugal blower (400-4000 scfm units)
- ☑ NEMA 1, standard 460/3/60 control panel
- ☑ Built-in duel safety
- ☑ Duel set point process temperature control to 250° F (121° C)
- ☑ Contactors on process heaters
- ☑ Electrical disconnect
- Fusing
- ☑ Two (2) clamps
- $\square$  One (1) thermocouple
- ☑ One 12 foot (3.6 m) length of high temperature dryer hose
- $\square$  460/3/60 supply voltage
- ☑ Manual Butterfly valve on inlet to adjust airflow

## 2-5 Optional Features

Options are available to match your hot air dryer with your specific drying requirements.

☑ Special voltages are available to match the power supply of your facility.

## **Chapter 3: Installation**

#### 3-1 Work Rules

The installation, operation, and maintenance of this equipment must be conducted in accordance with applicable work and safety codes for the installation location. This may include, but is not limited to, OSHA, NEC, CSA, and any other local, national, and international regulations.

- Read and follow these operating instructions when installing, operating, and maintaining this equipment. If the instructions become damaged or unreadable, additional copies are available from the manufacturer.
- Only qualified personnel familiar with this equipment should work on or with this dryer.
- Work with approved tools and devices

#### **Caution!** Disconnect the electricity before maintenance or service!

• If the dryer is installed with a power cord that can be unplugged, unplug it. If the dryer is permanently wired to a main power, a fused power disconnect must be installed to allow the disconnect to be locked in the OFF position. Open and lock the disconnect installed in the control enclosure. It is advisable to remove the disconnect fuses and carry them with you.

#### 3-2 Installation Location Considerations

Your hot air dryer was designed to be mounted indoors near the processing machine and connected to the drying hopper with the high temperature, flexible hose provided with the unit.

Note: Make sure to allow enough dryer hose to compensate for any movement of the drying hopper.

#### **Hose Connection**

- a. Remove the shipping cap from the air heater can outlet.
- b. Connect one end of the dryer hose to the outlet with a hose clamp.
- c. Attach the other end of the hose to the inlet of the drying hipper and secure with a hose clamp.
- d. Thermocouple is to be installed as close as possible to the hopper inlet tube

## 3-3 Making Electrical Connections

- ☑ Fulfill all national, state, and local safety and electrical code requirements.
- ☑ Only a qualified electrician should make electrical connections.
- **☑** Make sure all electrical connections are tight.

#### **Caution!** Disconnect the electricity before maintenance or service!

☑ If the dryer is installed with a power cord that can be unplugged, unplug it. If the dryer is permanently wired to a power main, a fused power disconnect must be installed to allow the disconnect to be locked in the

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#### Important!

If the blower is turning backwards, do not reverse the wires at the motor starters. Instead, reverse the two (2) wires at the wire drop.

> OFF position. The above should be performed in accordance with applicable safety regulations.

#### Power Drop

Refer to the serial number plate for voltage and phase requirements. The power drop must include a ground wire. Installation must conform to NEC, CSA, and/or other electrical safety standards in force at the installation site.

Blower Motor Rotation	
Most ACS dryers require a three (3)-phase power drop. When the drop is wire flows out of the delivery outlet. Incorrect wiring of the three (3) power leads v backward rotation of the blower.	•

## **Chapter 4: Startup and Operation**

#### 4-1 Introduction

Air is drawn through a filter, by a centrifugal blower. The air is blown through the process heater box where it is heated to the appropriate drying temperature. The temperature is controlled by a dual set point process temperature controller which includes a built-in process air safety to prevent material meltdown. Heated air is then directed either through an air diffuser assembly in an existing machine hopper or a drying hopper. These hopper combinations provide even air distribution through materials for maximum drying efficiency. The moisture-laden air is then discharged into the atmosphere.

## 4-2 Pre-Startup Checklist

Before you start the dryer, check the following:

- ☑ Make sure that all hose connections are correct.
- ☑ Make sure that the air filter is in place.
- ☑ Make sure that all electrical connections are complete and the control enclosure door is closed.
- ☑ Ensure thermocouple is in airstream

### 4-3 Starting the Dryer

- 1. Hot air dryers feature a disconnect switch on the control cabinet. This switch must be placed ON and the ON/OFF switch placed ON to operate the dryer. When the ON/OFF switch is in the ON position, a power lamp will light.
- 2. Set the process air temperature control using the up and down arrow keys to the desired temperature and an amber Air Heat lamp will light when the heaters are on.
- 3. Operation of the dryer is completely automatic requiring no further attention once the unit is running and the temperature is set.

Note: A built-in safety will open if a high temperature condition exists. If this should happen, both indicating lamps and the unit will shut off. Motor overload and control circuit protection are provided in the control cabinet. In addition, if no air pressure from the fan is detected the unit will shut down.

## 4-4 Air Adjustment

Air flow is to be adjusted for optimum air flow

- Adjust butterfly valve until the desired air flow to material drying is met
- ✓ Make sure not to fully close the valve

## 4-5 Shutting Down the Dryer

To shut down the hot air dryer:

- 1. Turn the ON/OFF switch to the OFF position.
- 2. Turn the disconnect handle to the OFF position.

## 4-6 Drying Non-Hygroscopic Materials

Non-hygroscopic materials retain surface moisture which has to be removed to ensure high product quality. Different materials require different times and temperatures to thoroughly dry. Recommended drying rates are listed in the figure below.

**Recommended Plastic Resin Drying Conditions** 

A Name	Drying Parameters		neters	Chamical Decembrish	
Acronym or Common Name	Hours	Temp [F]	Temp [C]	Chemical Description	
Acrylic [Homopolymer]	1-2	200-220	94-220	Acetal Resin	
HDPE	1-2	160-180	71-82	High Density [Linear] Polyethylene	
LDPE	1-2	160-180	71-82	Low Density [Convetional] Polyethylene	
PP	1-2	170-190	77-88	Polypropylene	
PS [Styrene]	1-2	180-190	82-88	Polystyrene	
PVC [Flexible]	1-2	160-180	71-82	Polyvinyl-Chloride	
PVC [Rigid]	1-2	160-180	71-82	Polyvinyl-Chloride	

## **Chapter 5: Maintenance**

## 5-1 Maintaining Blower Motors

The motor is self-lubricated for normal bearing life. For longest life, re-lubricate bearings annually. Remove drain plug. Inject good quality NLGI Grade 2 grease into fill hole. Run motor to discharge excess grease. Replace plug. Do not over-grease.

## 5-2 Cleaning the Cartridge Filters

These units are equipped with a cartridge type air filter. It must be inspected and cleaned regularly depending on operating conditions. Remove the filter cartridge and shake or vacuum clean. Replace the cartridge if it cannot be cleaned. Remove all loose material from the canister. Reassemble.

**Caution!** Do not run dryer without filter in place!

### 5-3 Temperature Safety Set Point

The temperature control on the hot air dryer has two set points.

- The *process temperature set point* is adjusted by pressing the up or down arrows on the control.
- The *safety set point* is set automatically as an interval above the process temperature set point.

Operation notes:

- If the actual temperature exceeds the set temperature by more than 25 degrees Fahrenheit the unit will alarm. If moving from a low set point to a high set point, incremental increases will avoid an alarm.
- If the unit exceeds the factory programmed high temperature limit the unit will alarm and shut down.

## 5-4 Replacing the Heater Element

The best quality industrial heaters are used in the air heater compartment. Because most dryers are working 24 hours a day, everyday that your processing machines are operating, these heaters may need occasional replacement. On page 25 there is a visual component makeup of the heater element.

- 1. Disconnect the electrical power source.
- 2. Remove the heater cover, exposing both the heater bank and the terminals of the heaters. Note the location of lead and jumper wires.
- 3. Remove the four bolts on each heater element and remove.

- 4. Check each heater element individually with an ohmmeter to determine which element burned out.
- 5. When replacing heater elements, make sure gaskets are good. If gaskets are damaged, replace immediately. Rewire the elements, making sure jumpers are in their correct position. All models are wired in parallel wye as shown on the electrical prints.

# **Chapter 6: Troubleshooting**

Problem	Possible Cause	Possible Remedy	
Little or no air coming from process.	Dirty air filters.	Clean or replace filters.	
Suction in delivery tube.	Phase is reversed on power drop coming into the dryer.	Stop the dryer. If the dryer was connected to the drying hopper, verify that no material has been sucked into the heater can. Change the phase of two legs of the 3-phase power drop. Never change the phase at the motor starters.	
Reduction of process air	Process heaters are faulty.	Replace.	
temperature	Process air flow is too high	Dampen air flow by turning butterfly valve.	
	Solid-state temperature control is faulty.	Replace.	
	Process temperature was adjusted in error by plant personnel.	Make sure that the plant personnel are aware of the proper temperature set point. A sign posted next to the control would be helpful.	
Reduction in drying capacity.	Process heaters are faulty.	Replace	
	Process air flow is too low	Increase air flow by turning butterfly valve	
	Change in material being dried from material which was originally specified.	Drying systems are designed for the material which was specified at the time of purchase. Different materials may need longer residence times or higher drying temperatures.	
	Break in flex hose to drying hopper.	Inspect for air leaks. Replace if necessary.	
Material is exhausting from dryer hopper outlet	Process air flow is too high	Dampen air flow by turning butterfly valve.	
Material in drying hopper cakes, or meltdown occurs.	Process temperature set too high due to operator error.	Check plastic data sheet for meltdown temperature. Make sure that plant personnel are aware of the correct process temperature set point.	
	Safety set point out of adjustment.		

Inited States: Asia/Australia:

# urg – Corporate Offices hapter 9 Xingpu Roll pendix Julie 588

chaumburg, IL 60173 hone: + 1 847 273 7700

Fax: +86 512 8717 1916

7-1 Technical Assistance

7-1 lin – Manufacturing Facility 900 S. 160<sup>th</sup> Street

ax: + 1 847 273 7804

ACS Warsaw

lew Berlin, WI 53151 Parts and Service Department

#### For immediate assistance, please contact:

North, Central and South America, 8am – 5pm CST +1 (800) 483-3919 for drying, conveying, heating and cooling and automation. For size reduction: +1 (800) 229-2919.
 North America, emergencies after 5pm CST (847) 439-5855
 North America email: acsuscanadacustserv@corpemail.com

Mexico, Central & South America
 Email: acslatinamericacustserv@corpemail.com

Europe, Middle East & Africa +48 22 390 9720
 Email: acseuropecustserv@corpemail.com

Asia/Australia +86 512 8717 1919
 Email: acsasiacustserv@corpemail.com

#### Sales and Contracting Department

Our products are sold by a worldwide network of independent sales representatives. Contact our Sales Department for the name of the sales representative nearest you.

Let us install your system. The Contract Department offers any or all of these services: project planning; system packages including drawings; equipment, labor, and construction materials; and union or non-union installations.

#### For assistance with your sales or system contracting needs please Call:

North, Central and South America +1 (262) 641-8600 or +1 (847) 273-7700 Monday–Friday, 8am–5pm CST

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### -Notes-